



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Smith et al.
Serial No. : 09/851,185
Filed : May 7, 2001
Title : CHEMICAL MECHANICAL POLISHER WITH GROOVED BELT

Art Unit : 3723
Examiner : Shantese McDonald

#11
1/20/04

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF SEPTEMBER 26, 2003

In reply to the Office Action of September 26, 2003, Applicant submits the following remarks. Claims 1-15, 17, 18 and 20-25 are pending. Applicant respectfully requests reconsideration in view of the following submission.

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Section 103 Rejections

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Claims 1-14, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,406,363 (Xu) in view of U.S. Patent No. 6,063,215 (Harrington). The applicant submits that the amended claims are not obvious in light of Xu and Harrington.

Claim 1 recites, *inter alia*, a polishing belt having a polishing surface to contact a portion of a substrate while the polishing belt is moving in a first direction in a generally linear path relative to the substrate, the polishing belt having a plurality of grooves oriented substantially perpendicular to the first direction of motion.

Xu teaches a belt for polishing a semiconductor wafer (Abstract, lines 1-2). The Examiner concedes that Xu does not teach that the belt has grooves oriented substantially perpendicular to the first direction of motion, as required by claim 1. For grooves oriented

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substantially perpendicular to the first direction of motion, the Examiner directs Applicant to Harrington.

Harrington teaches a belt for use in the casting of metals (Abstract, lines 1-2). In the described method of metal casting, molten metal is directed between two thermally treated belts of a casting apparatus (column 4, lines 31-40 and 52-53, column 5, lines 11-17 and 50-54). The belts are treated to introduce surface irregularities, such as transversely extending grooves, onto the surface that comes in contact with the molten metal (*id.*). The surface irregularities serve to improve the uniformity of heat transfer between the belt and the molten metal by providing cavities in which surface gases can be collected or allowed to escape from between the belt and the molten metal (column 3, lines 15-25). Conventional techniques of casting metal between belts that are cooled by a cooling fluid had the problem of the belts being subjected to a high thermal gradient that caused distortion in the belts (column 1, lines 29-40).

Applicant submits that Harrington is not analogous art to Applicant's claimed invention (see Manual of Patent Examiner Procedure § 2141.01(a)). For a reference to be replied upon under 35 U.S.C. § 103, the reference must "either be in a field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminiski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) ("A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.").

The first test for whether a reference is analogous art is whether the field of the reference is that of the field of Applicant's claimed invention. Applicant's claimed invention relates to an apparatus for polishing substrates. Harrington teaches an apparatus for casting molten metal, not polishing a surface. The casting belt takes molten metal and confines it in the shape of a metal strip, simultaneously aiding in the transport of heat away from the metal strip. Further, the metal is deposited on a the belt rather than rubbed against the belt. Unlike a belt for casting metal, Applicant's apparatus has a belt with grooves that provide a way to distribute slurry to the substrate more uniformly. The belt is rotated against the surface of a substrate repeatedly,

bringing slurry to and polishing the irregularities of the substrate with each pass. Applicant submits that casting metal is not the same field as polishing.

Failing the first test, a reference may still be analogous art if the reference is reasonably pertinent to the particular problem with which the inventor was concerned. Applicant's invention seeks to improve slurry distribution to the belt and to a substrate during polishing. Slurry is deposited on the belt and carried to the substrate in the grooves. With the grooves, the slurry may be redirected around the substrate due to the pressure of the substrate against the belt. The method in Harrington seeks to solve the problem of heat transfer and the belt distorting and adversely affecting the surface quality of a cast metal. A person of ordinary skill in the art seeking to provide slurry to a substrate surface on a belt that is rotating against the substrate would not be motivated to look to a solution to the problem of transporting heat from molten metal during casting.

Because Harrington is not available as art under section 103 and Xu fails to recite grooves oriented substantially perpendicular to the first direction of motion of a belt, Applicant submits that claims 1-14 and 20 are allowable in light of Harrington and Xu.

No fee is believed due, however please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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